

AMENDMENTS

Please amend claims 1, 6, 12-14, 39, and 40. Also, please cancel claims 5, 9, 41, and 42. Furthermore, please add new claims 43 and 44, all as shown in the claims list below.

Claim 1 (currently amended). A fuser assembly, comprising:

a roller having a metal heat absorptive outer layer on an inner core of thermally isolating material; [[and]]

a radiant heating element; positioned adjacent and external to said outer layer of said roller

a controller configured to detect a thermal property of said roller and, in response, dynamically control said heating element, wherein said thermal property includes a differential temperature measured on either side of a nip region of said roller.

Claims 2-3 (canceled).

Claim 4 (previously presented). The fuser assembly according to claim 1 further comprising a temperature transducer configured to detect a surface temperature of said roller.

Claim 5 (canceled).

Claim 6 (currently amended). The fuser assembly according to claim [[5]]1 wherein said controller is further responsive to a quantity of toner applied to a section of media corresponding to a section of said fuser roller heated by said heating element.

Claim 7 (original). The fuser assembly according to claim 1 wherein said radiant heating element comprises:

a heating array; and
a heat deflector disposed to direct at least a portion of heat radiated by said heating array toward said roller.

1 Claim 8 (original). The fuser assembly according to claim 7 wherein said heat
2 deflector also directs at least a portion of heat radiated by said heating array toward
3 a media to thereby preheat said media prior to engaging said roller.

4 Claims 9-11 (canceled).

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6 Claim 12 (currently amended). The ~~fusing~~fuser assembly according to claim 1
7 further comprising a media preheating element configured to radiationally heat said
8 media prior to being received by said roller.

9 Claim 13 (currently amended). The ~~fusing~~fuser assembly according to claim 1
10 wherein said heating element includes a plurality of longitudinally oriented heating
11 arrays circumferentially spaced along a periphery of said roller.

12 Claim 14 (currently amended). ~~The fusing~~A fuser assembly, comprising: according
13 to ~~claim~~ 7 including

14 a roller comprising a metal heat absorptive outer layer on an inner core of
15 thermally isolating material;

16 a radiant heating element positioned adjacent and external to said outer layer
17 of said roller, and comprising a heating array and a heat deflector disposed to direct
18 at least a portion of heat radiated by said heating array toward said roller; and,

19 a controller configured to detect a thermal property of said roller and, in
20 response, dynamically control said heating arrays, wherein said thermal property
21 includes a differential temperature measured on either side of a nip region of said
22 roller.

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1 Claim 15 (previously presented). A heated fuser, comprising:

2 a fusing roller comprising low thermal mass outer layer surrounding a
3 thermally isolating core;

4 a pressure roller comprising an elastomeric outer layer, the pressure roller
disposed adjacent to the fusing roller;

5 a pair of temperature sensors configured to measure a temperature
6 differential therebetween; and

7 a radiant heating device disposed external to said fusing roller and configured
8 to heat said low thermal mass outer layer of said fusing roller to a desired operating
temperature.

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10 Claim 16 (previously presented). The heated fuser according to claim 15 wherein
11 said outer layer is metal.

12 Claim 17 (canceled).

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14 Claim 18 (original). The heated fuser according to claim 15 wherein said radiant
15 heating device is further configured to heat a media prior to said media engaging
16 said fusing roller.

17 Claim 19 (previously presented). A method of fusing toner onto a media comprising:

18 heating a fusing roller using only radiant heat directed toward a surface of
19 said fusing roller;

20 forming a nip region between said fusing roller and a pressure roller, wherein
21 said nip region has an infeed side and an outfeed side;

22 transporting the media into rolling contact with said fusing roller and through
23 the nip region to simultaneously heat said toner to a desired temperature and apply
24 pressure to the toner causing the toner to fuse to the media; and

25 detecting a temperature differential between said infeed side and said outfeed
side of said nip region.

1 Claim 20 (previously presented). The method according to claim 19 further
2 comprising:

3 applying the toner to the media;

4 radiationally preheating the toner on a portion of the media prior to
5 transporting said media into rolling contact with said fusing roller.

6 Claim 21 (previously presented). The method according to claim 19 further
7 comprising controlling heating of said fusing roller in response to detecting said
8 temperature differential.

9 Claim 22 (previously presented). The method according to claim 21 further
10 comprising:

11 ascertaining an additional parameter; and

12 controlling heating of said fusing roller in response to ascertaining said
13 additional parameter.

14 Claim 23 (previously presented). The method according to claim 22 wherein said
15 additional parameter is selected from the group comprising: heat energy required per
16 unit weight of applied toner; heat energy required per unit volume of applied toner;
17 average density of toner to be fused; maximum density of toner to be fused; media
18 speed; heater efficiency; ambient air temperature; and, ambient air humidity.

19 Claim 24 (previously presented). The method of claim 19, further comprising
20 detecting a media thickness in response to detecting said temperature differential.

21 Claim 25 (previously presented). The method of claim 19, further comprising heating
22 said pressure roller using only radiant heat directed toward a surface of said
23 pressure roller.

24 Claim 26 (previously presented). The fuser assembly according to claim 1 wherein
25 said inner core is substantially fabricated from a foamed material or a
particulate material.

1 Claim 27 (previously presented). The fuser assembly according to claim 1, wherein
2 said inner core is substantially fabricated from a material selected from the group
3 comprising: polyurethane; polystyrene; glass fibre; rubber; porcelain; mica; asbestos;
4 cork; kapok; and air.

5 Claim 28 (previously presented). The fuser assembly according to claim 1 wherein
6 said outer layer is substantially fabricated from a material selected from the group
7 comprising: aluminum; stainless steel; copper; tungsten; metalized rubber; and
8 ceramic.

9 Claim 29 (previously presented). The fuser assembly according to claim 1 wherein
10 said roller comprises a skeletal inner structure.

11 Claim 30 (previously presented). The fuser assembly according to claim 29 wherein
12 said skeletal inner structure defines at least one void that is configured to contain air.

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14 Claim 31 (previously presented). The fuser assembly according to claim 29 wherein
15 said skeletal inner structure comprises at least one rib radially extending from a
16 central shaft region to an outer cylindrical portion.

17 Claim 32 (previously presented). The fuser assembly according to claim 29 wherein
18 said skeletal inner structure comprises at least one spoke radially extending from a
19 central shaft region to an outer cylindrical portion.

20 Claim 33 (previously presented). The fuser assembly according to claim 13 wherein
21 each of said plurality of heating arrays is configured to be individually controllable.

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1 Claim 34 (previously presented). The fuser assembly according to claim 15,
2 wherein:

3 said fusing roller and said pressure roller together form a nip region that has
4 an infeed side and an opposite outfeed side;

5 one of said pair of temperature sensors is positioned proximate said fusing
6 roller and configured to detect a surface temperature thereof on said infeed side of
7 said nip region; and

8 another of said pair of temperature sensors is positioned proximate said fusing
9 roller and configured to detect a surface temperature thereof on said outfeed
10 side of said nip region.

11 Claim 35 (previously presented). The fuser assembly according to claim 15,
12 wherein:

13 said fusing roller and said pressure roller together form a nip region that has
14 an infeed side and an opposite outfeed side;

15 one of said pair of temperature sensors is positioned proximate said fusing
16 roller and configured to detect a surface temperature thereof on said infeed side of
17 said nip region; and

18 another of said pair of temperature sensors is positioned proximate said
19 pressure roller and configured to detect a surface temperature thereof on said
20 outfeed side of said nip region.

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1 Claim 36 (previously presented). The fuser assembly according to claim 15,
2 wherein:

3 said fusing roller and said pressure roller together form a nip region that has
4 an infeed side and an opposite outfeed side;

5 one of said pair of temperature sensors is positioned proximate said pressure
6 roller and configured to detect a surface temperature thereof on said infeed side of
7 said nip region; and

8 another of said temperature sensors is positioned proximate said fusing roller
9 and configured to detect a surface temperature thereof on said outfeed side of said
10 nip region.

11 Claim 37 (previously presented). The fuser assembly according to claim 15,
12 wherein:

13 said fusing roller and said pressure roller together form a nip region that has
14 an infeed side and an opposite outfeed side;

15 one of said pair of temperature sensors is positioned proximate said pressure
16 roller and configured to detect a surface temperature thereof on the infeed side of
17 said nip region; and,

18 another of said pair of temperature sensors is positioned proximate said
19 pressure roller and configured to detect a surface temperature thereof on said
20 outfeed side of said nip region.

21 Claim 38 (previously presented). The fuser assembly according to claim 18 further
22 comprising an auxiliary media/toner preheat unit configured to heat said media.

23 Claim 39 (currently amended). The fuser assembly according to claim 18 wherein
24 said radiant heating device comprises a heat reflectordeflector that defines:

25 a main aperture configured to direct heat energy therethrough and toward
26 said fusing roller; and

27 and a second aperture configured to direct heat energy therethrough and
28 toward said media.

1 Claim 40 (currently amended). The fuser assembly according to claim 7 wherein
2 said heat reflector~~or~~deflector is substantially fabricated from a foam material.

3 Claims 41-42 (canceled).

5 Claim 43 (new). A fusing method, comprising:

6 detecting a temperature differential measured between an input side and an
7 output side of a nip region of a pair of rollers; and

8 controlling a temperature of a heating element based on the temperature
9 differential.

10 Claim 44 (new). A fusing apparatus, comprising:

11 a pair of rollers defining a nip region;

12 a pair of temperature sensors configured to measure a temperature
13 differential across the nip region;

14 a heating element; and

15 a controller configured to control the heating element based on the
16 temperature differential.

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